such observations, we reproduce Dr. Ball's diagram representing his present series of observations on the assumption of his finally deduced parallax, 0″.4676. If this is the star's true parallax, it cannot affect the observed declinations to a greater extent than 0″.40, which is the maximum length of the ordinates in the curve. The large black dots indicate the observations, while the curve shows at every point the calculated effect of parallax. Of the discrepancies between the two, Dr. Ball remarks, that though some of them "seem large, relatively to the total amount to be measured, yet the greatest divergence of the observation from the curve is not more than the angle subtended by a penny-piece at the distance of fifteen or twenty miles."

Of Groombridge 1618, a star remarkable for its proper motion, we need only say that the parallax resulting from an elaborate series of observations is 0″.322 ± 0″.023; and, of the star (P iii. 242) suggested by Struve as suitable for a parallax series, that Dr. Ball finds its parallax inappreciable. Of the star 6 Cygni (B), however, more should be said, as comparison with 61 (B) Cygni shows both stars to be binary systems, with a large proper motion common to both, and color and magnitude substantially identical. Dr. Ball's investigations point to a parallax of 0″.482 ± 0″.054, so that to the other features of resemblance of the two systems we are to add the fact that the two objects appear to be equally distant from the solar system.

The parallax determinations of Dr. Gill and Dr. Elkin at the Cape of Good Hope are, without doubt, the most thorough and accurate work of the kind ever performed. The heliometer was not a large one, having an aperture of only four inches, and the interval of time set aside for the accomplishment of their programme was but eighteen months. It was considered essential that several of the parallaxes should be investigated independently by both observers, and with different comparison-stars, in order to obtain some test of the general accuracy of the conclusions reached; and, after much consideration and trial, the following stars were finally selected: α Centauri, Sirius, and ϵ Indi, for observation by both Gill and Elkin; Lacaille 9352, o_2 Eridani, and β Centauri, for observation by Gill alone; and ζ Tucanae, e Eridani, and Canopus, for observation by Elkin alone. In *Science*, vol. iii. p. 456, attention has already been called to the results of these investigations, and the remarkable degree of precision attained in the measurements. Every source of error of which it seems possible to conceive was most carefully considered, and terms for the elimination of such errors were suitably introduced into the equations of condition representing all the observations. The observers express their entire confidence, which must be shared by every one who critically examines their work, in the degree of exactitude which is indicated mathematically by their final results. All interested in the progress of stellar astronomy of precision will be glad to know that the important conclusions and suggestions in the memoir, with regard to future extended work in the same fields, are now to be put to the practical test by Dr. Gill and Dr. Elkin conjointly.

David P. Todd.

NOTES AND NEWS.

Among the prizes awarded at the annual meeting of the French academy on the 23d of February were the following: the Francoeur prize, to Mr. Emile Barbier; a prize of six thousand francs, for the progress in efficiency of naval forces, was divided between the hydrographic mission to Tunis, and Mr. Bailis for a work on artillery ('Traité de balistique rationelle'). Other prizes were given to Messrs. Manen and Hanusse (mechanics); to the Swiss engineer Riggenbach, the Monthyon prize, for his mountain railways; to Mr. Hoüel, the Poncelet prize, for his various contributions to pure mathematics; to Mr. du Rocher du Quengo, for his improvements in screw steam navigation; to Mr. Radau, the Lalande prize, for his memoir on diffractions; Mr. Ginzel, the Valz prize, for a paper on secular acceleration of the moon's motion; to Mr. G. Cabanellas, for his theory of the application of electricity to the transmission of power; Mr. Durand-Claye, for his researches on the diffusion of typhoid-fever; Mr. Chancel, for his work on the acetones; Messrs. Gustave Cotteau and Emile Rivière (geology); Messrs. Otto Lindberg, G. Sicard, L. Motelay, and Vendryès (botany); Mr. P. Fischer (zoölogy); Drs. Testut, Cadet de Gassicourt, and Leloir (medicine and surgery); Mr. Tourneux (embryology); Messrs. Cadiat and Kowalevski in anatomy; Messrs. Jolyet and Laffont in experimental physiology; Capt. H. Berthaut and Jules Girard in physical geography; Mr. Marsaut, 1,500 francs, for his investigations of safety-lamps for miners; Mr. de Tastes, for his work in meteorology; Mr. Valson, the Gegner prize, for his work in mathematics and physics; Dr. Neis, for geographical explorations; Dr. J. Boussingault, for applied chemistry. The Bréant prize of a hundred thousand francs for cholera researches was not awarded.

— The following account of unusual phenomena was received March 10, at the Hydrographic office, Washington, from the branch office in San Francisco. The bark Innerwich, Capt. Waters, has just arrived at Victoria from Yokohama. At midnight

of Feb. 24, in latitude 37° north, longitude 170° 15′ east, the captain was aroused by the mate, and went on deck to find the sky changing to a fiery red. All at once a large mass of fire appeared over the vessel, completely blinding the spectators; and, as it fell into the sea some fifty yards to leeward, it caused a hissing sound, which was heard above the blast, and made the vessel quiver from stem to stern. Hardly had this disappeared, when a lowering mass of white foam was seen rapidly approaching the vessel. The noise from the advancing volume of water is described as deafening. The bark was struck flat aback; but, before there was time to touch a brace, the sails had filled again, and the roaring white sea had passed ahead. To increase the horror of the situation, another 'vast sheet of flame' ran down the mizzen-mast, and 'poured in myriads of sparks' from the rigging. The strange redness of the sky remained for twenty minutes. The master, an old and experienced mariner, declares that the awfulness of the sight was beyond description, and considers that the ship had a narrow escape from destruction.

— A series of experiments has recently been conducted at Spezzia to ascertain the effect of torpedoes on a keel vessel of the type of the iron-clad Italia. Her steel plates were displaced and bent, and the water entered the compartments, but she maintained her position. The result is regarded as showing that the effect of torpedoes is overrated, and that they are insufficient for the defence of forts.

— The U. S. naval bureau of ordnance is experimenting with the megaphone in order to determine its usefulness in detecting the approach of hostile vessels and torpedo-boats while they are yet some distance off. It is thought, also, that by the aid of this instrument it may be possible to communicate between vessels by means of steam or other sound-signals at considerable distances.

— A cablegram received March 10, at the Harvard-college observatory, from Dr. Palisa, announces the probable discovery of Pogson's lost planet. Position, March 9^{d}.3533, Greenwich mean time; right ascension, 6 h. 44 m. 41.7 s.; declination, 28° 10′ 1″. And a message from Dr. Krueger, received March 15, announced the discovery of an asteroid by Dr. Luther. Position, March 14 d. 10 h. 50 m. 52.8 s., Greenwich mean time; right ascension, 11 h. 48 m. 48 s.; declination, + 5° 13′; eleventh magnitude. No motion mentioned.

— The preparations for the Inventions exhibition at South Kensington are proceeding briskly. The literature of the exhibition will differ considerably from that of the two other exhibitions. No handbooks are to be prepared, but the papers which will appear in the catalogue will to a large extent supply their place. The catalogue will contain twenty-three prefaces written by authorities upon the particular subjects intrusted to them. Amongst those who have already consented to contribute are Sir Henry Nugent, on 'Fire-arms and explosives;' Sir E. G. Reed, on 'Naval architecture;' Capt. Douglas Galton, on 'Railway plant;' Capt. Abney, on 'Photography;' Professor Unwin, on 'Machinery;' Professor Armstrong, on 'Physical and chemical apparatus;' Professor Vernon Harcourt, on 'Gas;' Mr. G. Matthey, on 'Fuel;' Dr. Hugo Miller, on 'Paper and printing.' The first part of the catalogue is already in the hands of the printers.

— We learn from *Nature* that the Geological society of London has just awarded the Wollaston medal to Mr. George Busk, for his researches on fossil polyzoa and on pleistocene mammalia; the Murchison medal to Professor Ferdinand Roemer, the eminent paleontologist of Breslau; the Lyell medal to Prof. H. G. Seeley, for his long-continued work on fossil saurians; and the Bigsby medal to Mr. Renard of the Brussels museum, on account of his petrographical researches.

— *Liouville's journal* is in future to be published quarterly to avoid the fragmentary publication of important mathematical papers.

— The original lectures delivered by Harvey at the College of physicians are to be published in autotype from the manuscript in the British museum, accompanied by a transcript.

— The Cambridge (Eng.) university press has just decided to publish Mr. Charles N. Doughty's account of his extensive travels in the interior of Arabia, during which he discovered in the Harras beds of lava similar to those in the Zejah or Argob of the Hauran district, south of Damascus. The maps are already completed: so there will be little delay in the publication.

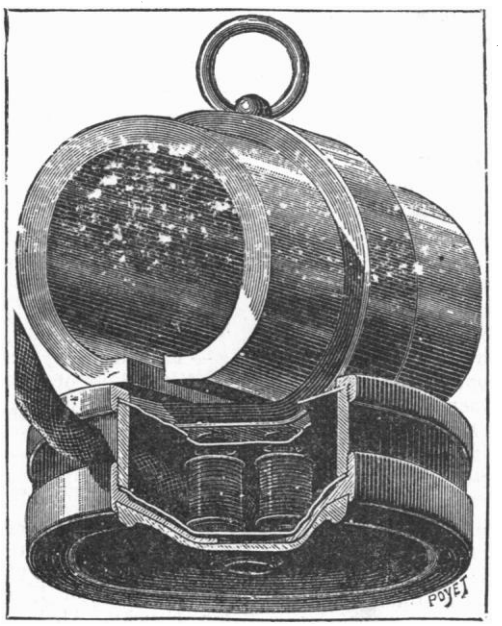
— The *Academy* announces the preparation, by Prof. O. Stolz of Innspruck, of 'Vorlesungen über allgemeine arithmetik,' intended to present in a form suitable to learners the results of modern researches on the science of number. The first part, now in press, contains an introduction on the conception of magnitude, treated in accordance with the views of Grassman; also chapters on the theory of irrational numbers, powers, roots, and logarithms, the theory of functions and of infinite series. The investigations of Hankel, Du Bois-Reymond, Cantor, Cauchy, Abel, Dirichlet, and other eminent mathematicians, have been carefully studied. The second part of the work will treat of the arithmetic of complex numbers, and some of its geometric applications.

— *Mind in nature*, a popular journal of psychical, medical, and scientific information, is announced to be published the first of every month, by the Cosmic publishing company, Chicago.

— The Journal of the Iron and steel institute notices some experiments recently made by Reinau (*Annales industrielles*) to determine the strength of iron as affected by different temperatures. It was found that the strength increased up to 554° F., at which temperature it attained a maximum, being thirty per cent stronger than at 68° F. Between 554° F. and 626° F., the decrease was very little, but the strength rapidly diminished after the last limit was passed. At 806° F. the bar broke under a load of only thirty per cent of the rupture load at 68° F.

— In *Revue de botanique* for October, 1884, Fonssagrives writes that fruits, even after being detached from the tree, give off both poisonous gases and carbonic-acid gas, thereby vitiating the air of a room so as to produce death by poisoning. Such accidents have been caused by ripe apricots, oranges, and quinces, which gave off the gas in the night. Had the air of the room been examined, there is little doubt that a sufficient quantity of oxygen to support life would have been found. Sweet-smelling flowers, such as jasmine, tuberose, and magnolia, and also odoriferous leaves, give off a similar deadly gas; and it seems that this gas must be in some way connected with the odor.

— *La Nature* publishes an account of a new loud-speaking telephone system recently presented by Mr. J. Ochorowicz to the International society of electricians and to the French society of physics. His transmitter is as yet a secret. The receiver, which is figured in the accompanying cut, is the same in principle with that of Bell. The magnet is formed of a hollow steel cylinder, with a slot on one side from five to six millimetres wide. To the centre of this cylinder are attached two little cores of soft iron, on which are rolled the bobbins. These bobbins are enclosed between two disks of thin sheet-iron. The lower plate, which is fixed firmly to the magnet, has two holes which freely allow the passage of the iron cores. The magnetism keeps the box in a state of tension. This receiver, with the peculiar transmitter of Mr. Ochorowicz, allowed speaking, singing, and music to be heard throughout the hall of the Paris geographical society, — a hall accommodating five hundred persons. In the microphone transmitter used by Mr. Ochorowicz, heat seems to play an important part, if one may judge from the fact that all the experiments made before the society of electricians on the 4th of February were successful except the last. Mr. Ochorowicz attributed this to the fact that the microphone needed to be hot: when it ceases to be so, the adjustment is destroyed, and can be re-established only by reheating. Leclanché cells were used, which became polarized, and allowed the transmitter to become cold.



OCHOROWICZ'S LOUD-SPEAKING TELEPHONE.

— A patent has been taken out in France by M. Tichenor for a process of butter-making by electricity. It is stated, that, the milk being placed in a vessel of special form, a pair of electrodes is introduced, and connected to a dynamo capable of yielding a current of forty volts, when in from three to five minutes the butter accumulates at one end of the poles in the form of little balls. The claims include the removal of rancidity from butter, and the manufacture of cheese, by the help of the current.

— We take the following account of the Fritts selenium cells from an advance copy of his paper, to appear in the Proceedings of the American association. "In the first place, I form the selenium in very thin plates, and polarize them, so that the opposite faces have different electrical states or properties. This I do by melting it upon a plate of metal with which it will form a chemical combination, sufficient, at least, to cause the selenium to adhere and make a good electrical connection with it. The other surface of the selenium is not so united or combined, but is left in a free state; and a conductor is subsequently applied over it by simple contact or pressure. During the process of melting and crystallizing, the selenium is compressed between the metal plate upon which it is melted, and another plate of steel or other substance with which it will not combine. . . . The non-adherent plate being removed after the cell has become cool, I then cover that surface with a *transparent conductor of electricity*, which may be a thin film of gold-leaf. Platinum, silver, or other suitable material may also be employed. The whole surface of the selenium is therefore covered with a good electrical conductor, yet is practically bare to the light, which passes through the conductor to the selenium underneath. My standard size of cell has about two by two and a half inches of surface, with a thickness of from $\frac{1}{1000}$ to $\frac{5}{1000}$ of an inch of selenium; but the cells can, of course, be made of any size or form. A great advantage of this arrangement consists in the fact that it enables me to apply the current and the light to the selenium in the same plane or general direction, instead of transversely to each other, as heretofore done."

— *Petermann's mittheilungen* has published a very detailed linguistic map of Hungary, with an article by Dr. T. v. Jekelfalussy of the statistical bureau, from which it appears, that, among every thousand inhabitants of the kingdom, there are 412 Magyars, 125 Germans, 154 Roumanians, 150 Croats and Serbs, and 119 Slovaks.